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The pros and cons of entry restrictions: are entry restrictions really effective in preventing the spread of SARS-CoV-2?

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Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has rapidly spread worldwide, leading the World Health Organization to declare coronavirus disease 2019 (COVID-19) a pandemic. To curb the unchecked spread of SARS-CoV-2 infection, most countries have enforced travel restrictions. However, it is debatable whether such restrictions are effective in containing infections and preventing pandemics. Rather, they may negatively impact economies and diplomatic relationships. Each government should conduct an extensive and appropriate analysis of its national economy, diplomatic status, and COVID-19 preparedness to decide whether it is best to restrict entering travelers. Even if travelers from other countries are allowed entry, extensive contact tracing is required to prevent the spread of COVID-19. In addition, governments can implement "travel bubbles," which allow the quarantine-free flow of people among countries with relatively low levels of community transmission. An accurate evaluation of the benefits and losses due to entry restrictions during the COVID-19 pandemic would be helpful in determining whether entry restrictions are an effective measure to reduce the spread of infection in future pandemics.

Keywords: COVID-19; Infection control; Public policy; SARS-CoV-2

Introduction

The rapid spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) worldwide has caused a pandemic. Many countries have enforced travel restrictions to reduce the spread of SARS-CoV-2 infections. However, it is unclear whether such restrictions can prevent this spread.

Review of previous studies on entry restrictions

To investigate the effect of worldwide travel restrictions applied in 2009 owing to the H1N1 influenza pandemic, Mateus et al. [1] performed a meta-analysis of 23 related studies in 2014. They discovered that entry travel restrictions decreased the prevalence of influenza infection by less than 3%. Moreover, entry and travel restrictions could not efficiently control flu outbreak in certain areas. However, entry and travel restrictions could postpone the peak of the pandemic or endemic progression of infectious diseases for several weeks or months. Additionally, Errett et al. [2] reported insufficient evidence on the prophylactic effects of entry and travel restrictions among countries on global infectious diseases, such as Middle East respiratory syndrome (MERS), SARS, Zika virus disease, and Ebola virus disease. Thus, entry and travel restrictions

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may be effective in controlling the spread of SARS-CoV-2 in early stages, providing additional time for countries to plan and implement necessary measures. However, despite travel restrictions, the influx of SARS-CoV-2 and its subsequent spread did not stop. In particular, the effects of entry and travel restrictions were less significant in densely populated regions, such as cities. Moreover, Cooper [3] reported that a large number of people canceled their travel plans during the SARS outbreak in 2003. Even without entry and travel restrictions, people refrained from traveling to other countries. Therefore, there is little evidence on the effects of entry and travel restrictions to prevent the influx of SARS-CoV-2.

Disadvantages of entry restrictions

Entry restrictions have the following disadvantages. First, they can affect global travel and trade, thereby slowing down the economy and weakening diplomatic relations across nations. For example, during the MERS outbreak in South Korea in 2015, Taiwan and some provinces of China issued advisories against traveling to South Korea. The estimated losses in the accommodation sector, transportation sector, and food and beverage services due to the decreased influx of visitors from abroad were 542 million US dollars (USD), 106 million USD, and 359 million USD, respectively [4]. In addition, during the coronavirus disease 2019 (COVID-19) outbreak, entry restrictions between South Korea and Japan have exacerbated diplomatic relations between the two countries. Second, in certain circumstances, entry restrictions may result in high transmission. For example, increased viral transmission among passengers and crews ensued because the passengers and crews on board the Diamond Princess cruise were prevented from entering Japan [5]. Third, ethical issues can arise, such as not being able to meet family members living abroad. Despite these negative influences, entry restrictions have been widely adopted to reduce the spread of COVID-19.

Advantages of entry restrictions

Entry restrictions have the following advantages. They allow more time to compensate for shortages of medical devices and facilities. Varying basic reproduction number (R0)—a number indicating the transmission power of an infectious disease between humans—has been reported for COVID-19 in previous studies (R0 of COVID-19: 2.0–6.47) [6,7]. The R0 is 2–5 for SARS, which spread to 37 countries worldwide from 2002 to 2003, resulting in 8,000 cases and 774 deaths, and it is 0.4–0.9 for MERS [8]. Studies have indicated that the R0 of COVID-19 is similar to that of SARS; however, in the real world, the propagation rate of COVID-19 is much faster than that of SARS. A huge number of infected people in a short period of time due to the rapid transmission of COVID-19 can cause a shortage of medical devices and facilities. However, for highly contagious diseases, such as COVID-19, entry restrictions, quarantine, contact isolation, and social distancing can help address the shortage of medical devices and facilities by slowing the speed of viral propagation. Koo et al. [9] emphasized implementing relatively standard outbreak control procedures to reduce or mitigate local spread rates if deployed in a timely manner and effectively. Assuming an asymptomatic proportion of 7.5% and an R0 of 1.5, infection of 94.6% to 99.4% of the population could be averted in 80 days by policies such as school closures, quarantines, combined intervention scenarios, and social distancing at work [9]. Ultimately, although it is impossible to reduce the total number of infected people, the reduction in the propagation rate can be boosted by government policies, such as entry limitations for travelers from foreign countries. By delaying the peak of the epidemic, countries can buy time to set up medical equipment and hospital beds to care for patients infected with SARS-CoV-2.

Conclusion

Entry restrictions have both disadvantages and advantages. Hence, each country should decide whether it is best to restrict incoming travelers based on an appropriate analysis of its diplomatic status, COVID-19 preparedness, and national economy. Even if the entry of foreign travelers is permitted, extensive contact tracing is required to curb the spread of COVID-19. In addition, the government can implement "travel bubbles," which allows the quarantine-free flow of people among countries with relatively low levels of community transmission. Additionally, an accurate evaluation of the benefits and drawbacks of entry restrictions during the COVID-19 pandemic can help determine whether entry restrictions are effective measures to reduce the spread of infection in future pandemics.

Notes

Conflicts of interest

No potential conflict of interest relevant to this article was reported.

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Author contributions

Conceptualization: DP, MBR, MCC; Investigation, Methodology: DP, MCC; Software: MCC; Validation, Funding acquisition: DP; Data curation: MBR, MCC; Writing-original draft: DP, MBR, MCC; Writing-review & editing: DP, MBR.

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References

1. Mateus AL, Otete HE, Beck CR, Dolan GP, Nguyen-Van-Tam JS. Effectiveness of travel restrictions in the rapid containment of human influenza: a systematic review. Bull World Health Organ 2014;92:868–880D.
2. Errett NA, Sauer LM, Rutkow L. An integrative review of the limited evidence on international travel bans as an emerging infectious disease disaster control measure. J Emerg Manag 2020;18:7–14.
3. Cooper M. Japanese tourism and the SARS epidemic of 2003. J Travel Tour Mark 2005;19:117–31.
4. Joo H, Maskery BA, Berro AD, Rotz LD, Lee YK, Brown CM. Economic impact of the 2015 MERS outbreak on the Republic of Korea's tourism-related industries. Health Secur 2019;17:100–8.
5. Tsuboi M, Hachiya M, Noda S, Iso H, Umeda T. Epidemiology and quarantine measures during COVID-19 outbreak on the cruise ship Diamond Princess docked at Yokohama, Japan in 2020: a descriptive analysis. Glob Health Med 2020;2:102–6.
6. Wu JT, Leung K, Bushman M, Kishore N, Niehus R, de Salazar PM, et al. Estimating clinical severity of COVID-19 from the transmission dynamics in Wuhan, China. Nat Med 2020;26:506–10.
7. Sanche S, Lin Y, Xu C, Romero-Severson E, Hengartner N, Ke R. High contagiousness and rapid spread of severe acute respiratory syndrome coronavirus 2. Emerg Infect Dis 2020;26:1470-7.
8. Wilder-Smith A, Chiew CJ, Lee VJ. Can we contain the COVID-19 outbreak with the same measures as for SARS? Lancet Infect Dis 2020;20:e102–07.
9. Koo JR, Cook AR, Park M, Sun Y, Sun H, Lim JT, et al. Interventions to mitigate early spread of SARS-CoV-2 in Singapore: a modelling study. Lancet Infect Dis 2020;20:678–88.